Research Article

Consideration of *Unchiku* Generation with Moving Illustration Using *Kabuki* Dance Knowledge

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ABSTRACT

An explanation generation system based on narratology and an *unchiku* generation system has been developed previously. Moreover, we developed an animation system that simulates the stage performance structure of a *kabuki* work, *Kyōganoko Musume Dōjōji*. Based on this background, this study presents the basic method of *unchiku* generation using a moving illustration system. In the prototype, we use the legend of Dōjōji and edit the general explanation and *unchiku* texts of *Kyōganoko Musume Dōjōji*. Further, the system supplements the *unchiku* using the corresponding animations. We refer to these animations as moving illustrations. These *unchiku* and animations are not intended to explain the story, but to provide deep knowledge of the explanations inserted in the story.

1. Introduction

Unchiku refers to accumulated in-depth knowledge for specific topic. In using as verb, *unchiku* is an explanation that uses in-depth content to share knowledge or teach a lesson to an audience; "*unchiku wo katamukeru* (to tilt one's *unchiku*)" means putting all your energy into that knowledge. In recent years, *unchiku* often refers to trivia. However, trivia corresponds to "*unchiku wo tareru* (to drop one's *unchiku*)" and "*unchiku wo hikerakasu* (to show off one's *unchiku*)" in Japanese which refers to showing off knowledge learned from undesirable situations.

Unchiku is included in narratives where it is used for the techniques for introducing description, explanation, and more in-depth knowledge regarding various objects appearing in a story. These techniques represent a narrative method that embodies a story as a temporal sequence of events using methods. In the framework of narratology, *unchiku* is strongly related to narrative discourse which refers to how a story is actually narrated. In previous studies, the various aspects of narrative discourse [1], including the "distance" between the storyteller and the story, based on the structuralist theories proposed by Genette [2] have been discussed. Considering this formal viewpoint, *unchiku* is classified as a narrative technique of explanation for slowing the temporal progression of a story by introducing information except in instances where events are described.

On the other hand, from the viewpoint of the information that is transmitted to the reader through a narrative, *unchiku* and explanation are different. Explanation is staging comprehensively where the goal is to contribute to the readers' understanding of the content. On the other

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hand, *unchiku* means in-depth academic and other knowledge where the goal is to provide the readers with knowledge beyond a simple understanding of the content. *Unchiku* does not differ from a general explanation. Although it is still a working hypothesis in this study for progressing this research, the explanation is for the knowledge in the degree of that is covered in the general dictionaries and encyclopedias such as Wikipedia. In contrast, *unchiku* corresponds to the explanation of knowledge that can be gained through a deeper and broader survey and procedure, and actual seeing (in the case of *kabuki* which is used as an object in this study).

As mentioned above, this study chooses a *kabuki* work and the related story as the object and the proposed system selects, generates, and represents the explanation and *unchiku*. Currently, many people have an obscure understanding of the word *kabuki*. Of course, although, for the beginners of *kabuki*, general knowledge and explanation are important, *kabuki* is a traditional art form and understanding *it* requires deep and academic knowledge. In *kabuki*, *unchiku* information is necessary and important, in addition to general explanations. *Kabuki* is an appropriate topic for studying *unchiku*-like explanations and general explanations.

Furthermore, in *kabuki*, the actual stage performances themselves are also called "text" and they are probably emphasized more than the scenarios [3]. Many *unchiku*s of *kabuki* are difficult to fully understand without viewing the actual stage performances. In this way, the use of animation supplements and strengthens the unchiku texts.

An explanation of the technical terms has been discussed in a study [4]. Another study explained the problem-solving process of artificial intelligence systems [5]. We designed a mechanism for *unchiku* generation [6] [7] for integration into our narrative generation system. Additionally, we applied *unchiku* generation to our study of *kabuki* [8] [9].

Moreover, we developed a prototype that complements the story represented through a *kabuki* dance with by inserting animations. We also investigated *kabuki* narrative generation by comprehensively examining the structure, methods, and narrative techniques to refine our narrative generation system. In our research system [10] [11], we focused on the analysis of *kabuki* based on the performance structure on stage was central. To further our narratological research with regard to *kabuki* [12], we placed the "work performed on stage" at the center and identified the list of its multiple components [13]. Our

analysis focuses on the *Kyōganoko Musume Dōjōji* [14] [15] [16] [17], a kabuki narration of the legend of Dōjōji, performed by *on'nagata* (male actors playing female characters) since ancient times with new content added beyond the original legend.

Based on the abovementioned considerations, this study proposes a system that organizes and represents the *unchiku*, explanation texts, and animations of the legend of Dōjōji using *Kyōganoko Musume Dōjōji*, a *kabuki* dance work. Based on the difference in conceptual definitions, *unchiku* and explanation are generated according to their respective methods. In particular, the explanation texts are generated using Wikipedia, and the *unchiku* texts and the related animations are generated based on our original narrative analysis of the *kabuki* and other materials.

2. Two Background Systems

This section describes the *unchiku* generation system and animation system of the *Kyōganoko Musume Dōjōji* as our previous studies. The prototype incorporates these two systems in this paper.

2.1. *Unchiku Generation System*

We developed an *unchiku* generation system to establish a starting point and means to systematically collect, accumulate, and utilize *kabuki* knowledge [4] [5]. Originally, Wikipedia was used for information to develop our *unchiku* generation system. Specifically, we used the page "Ichikawa Ebizō (11th generation) - Wikipedia," which is the Japanese Wikipedia article on "Ichikawa Ebizō XI," and 226 pages (entries) that can be referred to by links from the text on that page.

When a decision was made to generate and insert a *unchiku*, its structure was generated and inserted into the story at regular intervals. In this case, the attribute frame based on the noun concept associated with the word to be explained was referred to.

A problem in this system was that the differences and relationship between *unchiku* and explanation were not analyzed in-depth. Based on the discussion in **Introduction**, this system dealt with general explanations other than *unchiku*. The system proposed in this study reconsiders this point.

2.2. Animation System of Kyōganoko Musume Dōjōji

This section explains an analysis of *Kyōganoko Musume Dōjōji* and an animation system based on the analysis in previous study.

2.2.1. Analyzing Kyōganoko Musume Dōjōji

The animation system depends on the stage performance structure. The data on *Kyōganoko Musume Dōjōji* were derived from our earlier analyses [8] [9].

Kyōganoko Musume Dōjōji recounts the legend of Dōjōji. In the legend, a young woman named Kiyohime falls in love with Anchin, a Buddhist monk who rejects her. She turns into a snake and kills him. After more than a thousand years of telling this story through oral histories, picture scrolls, and other reading material, the story has transformed into the present-day *Kyōganoko Musume Dōjōji*.

We focused on the following three elements described in the book by Tamotsu Watanabe [18], a contemporary *kabuki* researcher and critic: *kokoro* (core conceptual theme), *furi* (performance), and *shisyo* (lyrics). Based on the reconsideration of the elements, we created a table that represents the stage performance structure of *Kyōganoko Musume Dōjōji* [14]. The main components of the stage performance structure are the characters, background (stage set), music (instruments, performers, and genres), lyrics, *furi*, and *kokoro* of each scene. Although it includes the elements related to the story of *Kyōganoko Musume Dōjōji*, many elements related to the structural aspects of work are mainly includes in the table.

2.2.2. Developing an Animation System Based on the Analysis

To develop our animation system, we summarized the stage performance structure of *Kyōganoko Musume Dōjōji* [19] in an analysis table. We have discussed our analysis of the stage performance structure in detail [12] and how an animation system called KOSERUBE, a folktale-style story generation system, was developed to express it [20].

With this system, users can select folktales and characters, and it automatically generates a story based on the selections. It also generates an animation and displays the lyrics at the bottom of the screen; the background and characters change from scene to scene.

Our animation system can also reproduce and generate music [13] based on the score of *Syamisen Bunkahu*

Nagauta Kyōganoko Musume Dōjōji [21] and recorded music stored in the system.

This animation mechanism was based on a detailed analysis of *Kyōganoko Musume Dōjōji* using the script and the video materials. The analyzed knowledge formed the original *unchiku* information. The system proposed in this study used the animations to supplement the *unchiku* information. We called each animation moving illustration.

3. *Unchiku* Generation with Moving Illustration

Based on the above-mentioned two systems for *unchiku* generation and animation representation using a *kabuki* work and *kabuki*-related knowledge, the system proposed in this study corresponds to a prototype of *unchiku* generation with animation representation. Furthermore, the prototype aims to analyze the plans and issues for future full-scale development. This section describes the proposed system and its knowledge.

3.1. Architecture for the Proposed System

In the proposed system, for a story, the *unchiku* generation is supplemented by inserting animations to produce an animation. Moreover, general explanation texts are also represented. The system has three modules, including an explanation selection mechanism for more general explanation texts, an *unchiku* generation mechanism for creating *unchiku* texts, an expression mechanism for representing explanation and *unchiku* texts, and animation supplementing the *unchiku* in order. The story is formatted such that the proposed system can be easily handled. We organized the legend of Dōjōji and expressed it in a sequence of single sentences. The story was not automatically generated in this prototype.

3.2. Knowledge-for the Proposed System

In this study, the definition of knowledge was limited to knowledge of explanation and *unchiku*. We limit the latter to that of *Kyōganoko Musume Dōjōji*. Further, we describe the knowledge bases for explanations and *unchiku*. We also provide English supplements to the actual data and generate examples.

Although the comprehensive name of the proposed system is called *unchiku* generation with a moving illustration, a part of *the unchiku* generation includes both general explanation and *unchiku* generation mechanisms. These mechanisms use the subsequently detailed knowledge sources.

3.2.1. Knowledge for Explanation

Figure 1 shows the input data for the system. These data were created based on a part of the legend of Dōjōji introduced in Section 2.2.1. The knowledge for explanation is acquired from Figure 1; we acquired knowledge about Anchin, Kumano, Kiyohime, and Dōjōji.

The explanation of the story is presented in Figure 2. This knowledge was acquired from Wikipedia. However, for Anchin and Kiyohime, we use "The legend of Anchin and Kiyohime" because there is no corresponding article on Wikipedia. For Anchin and Kiyohime, the outline of the article and the first paragraph of the article is assigned respectively.

As stated above, the knowledge for explanation corresponds to the general knowledge acquired from Wikipedia.

3.2.2. Knowledge for Unchiku

The knowledge for *unchiku* is illustrated in Figure 3. This knowledge relates to a scene in *Kyōganoko Musume Dōjōji*. Figure 3 presents the knowledge based on the *Chūkei no Mai* scene (we chose 1 of the 11 scenes in *Kyōganoko Musume Dōjōji* to identify the processing procedure). It was generated from the stage performance structure table created by Kawai [14]. The details of each item are as follows.

- **Flow of the stage performance**: The flow of events on the actual stage.
- **Time**: The time in which the displayed part of the lyrics is changed to the next.
- **Characters**: People appearing on the stage Although the central character of *Kyōganoko Musume Dōjōji* is *Shirabyōshi* Hanako, many *Shoke*s also appear.
- **Mind**: It is the word that represents the most essential or symbolic mental state of Shirabyōshi Hanako, who is the central character in dramatic scenes.
- **Action**: The genres of dances performed by Hanako.
- **Lyrics**: The lyrics sung or narrated, written by *Fujimoto Tobun*.
- **Scene of the legend of Dōjōji**: It shows whether the associated scene of the legend of Dōjōji is negative or positive.
- **Music genres and characteristics**: The genre or features of the music played in each scene.
- **Narrators/Singers**: Narrators or singers of the lyrics and their total number.

年老いた僧と安珍が熊野に参詣へ行く。年老いた僧と安珍がある家に到着する。清姫が安珍に会う。清姫が安珍に惚れる。安珍は清姫を恐れる。安珍は「安珍と清姫が再会する」という嘘をつく。安珍はある家を過ぎる。清姫は嘘を知る。清姫は激怒する。清姫は蛇体に変身する。清姫は安珍を追う。安珍は道成寺に到着する。[An old monk and a young monk, Anchin, go to visit Kumano. They arrive at a house. Kiyohime meets Anchin. Kiyohime falls in love with Anchin. Anchin is afraid of Kiyohime. Anchin tells a lie by saying, "Anchin and Kiyohime will meet again." Anchin avoids the house. Kiyohime realizes it was a lie. Kiyohime gets angry. Kiyohime transforms into a snake. Kiyohime chases Anchin. Anchin arrives at the Dōjōji Temple.]

Fig. 1. The story of the legend of Dōjōji.

- **Musicians**: The instrument players on the stage according to the types of instruments and the total number of musicians.
- **Musical instruments**: The types of instruments played on the stage.
- **Background music/Wooden clappers**: *Geza* is a room that is hidden from the audience on the left side of the stage; the players in the *geza* mainly play sound effects. *Hyōshiita* is an instrument used by players on the right side of the stage according to the narrative.
- **Scene**: The background of the stage.
- **Place on stage**: Each narrative place where one or more dramatic characters exist.
- **Costume**: The costume that *Shirabyōshi* Hanako wears.
- **Small props**: The small props that *Shirabyōshi* Hanako has.
- **Stage equipment**: The backgrounds and objects on the stage.
- **Point of the dancer's body**: In each scene, the part of Hanako's body is focused on.

Unlike general explanation knowledge, this *unchiku* knowledge is original knowledge acquired from the detailed survey and analysis of the stage performance structure of *Kyōganoko Musume Dōjōji*.

((安珍 [Anchin]

安珍・清姫伝説（あんちんきよひめでんせつ）とは、紀州道成寺にまつわる伝説のこと。思いを寄せた僧の安珍に裏切られた少女の清姫が激怒のあまり蛇に変化し、道成寺で鐘ごと安珍を焼き殺すことを内容としている。[The monk, in an attempt to avoid meeting her, chose a different route on the return journey, and the woman died in grief when she found out that he was deliberately avoiding her. After her death, a great serpent emerged from her bedchamber and it pursued the monk before killing him in a bell in the Dōjōji temple where he had hidden.]

(熊野 [Kumano]

熊野（くまの）は、紀伊半島南端部の和歌山県南部と三重県南部からなる地域。[Kumano (Kumano-shi) is a city located in Mie Prefecture, Japan.]

(清姫 [Kiyohime]

安珍・清姫伝説とは、和歌山県日高川町にある天台宗の寺院である道成寺にまつわる平安時代の伝承にして仏教説話であり、若き僧安珍と清姫の悲恋と情念をテーマとして能、歌舞伎、浄瑠璃などさまざまな題材にされてきた話である。「道成寺縁起」とも呼ばれる。[Kiyohime (or just Kiyo) in Japanese folklore is a character in the story of Anchin and Kiyohime. In this story, she fell in love with a Buddhist monk named Anchin, but after her interest in the monk was rejected, she chased after him and transformed into a serpent in a rage, before killing him in a bell where he had hidden in the Dōjōji temple.]

(道成寺[Dōjōji]

道成寺（どうじょうじ）は、和歌山県日高郡日高川町鐘巻にある天台宗の寺院。新西国三十三箇所第 5 番札所。道成寺創建にまつわる「髪長姫伝説」（「宮子姫伝記」）や、能、歌舞伎、浄瑠璃の演目として名高い「安珍・清姫伝説」で知られる。この伝説は、平安時代中期に編纂された『大日本国法華験記』にすでに見える古い話である。[Dōjōji is a Tendai school Buddhist temple in Hidakagawa, Wakayama Prefecture, Japan. Founded in 701, it name has been used in a number of plays, the statues of *Senjū Kannon*, *Nikkō Bosatsu*, and *Gakkō Bosatsu* are National Treasures, and there are a number of other Important Cultural Properties.])

Fig. 2. Knowledge for explanation.

3.3. *Mechanisms of the Proposed System*

The proposed system selects explanation texts for a given story before generating *unchiku* texts and related animations. The entire system including the explanation selection, *unchiku* generation, and expression mechanisms, is called an *unchiku* generation system with moving illustrations. In particular, the system confirms all noun concepts included in the input story from the beginning of the story and when the system finds a noun to be processed as a keyword, it executes the above processing.

Unchiku is generated based on the stage performance structure of a scene of *Kyōganoko Musume Dōjōji* (Fig. 3). In the prototype, *unchiku* knowledge corresponded to Kiyohime, Anchin, Kumano, and Dōjōji which are the keywords for explanation, is generated or edited by the following methods.

3.3.1. *Explanation Selection Mechanism*

The explanation selection module in the *unchiku* generation system with a moving illustration receives a story as an input and selects the explanation texts that associate a keyword and the related *unchiku* from the knowledge for explanation. Here, keywords are nouns that match the items in the knowledge of explanation and, in this prototype, Anchin, Kumano, Kiyohime, and Dōjōji presented in 3.2.1 and Figure 2 are included. In particular, the following processes are executed in order:

1. The module searches for a keyword that matches the text in the knowledge for explanation from the beginning of the story.

2. The module selects the explanation text based on a keyword that is identified from the knowledge for explanation.

This module executes only the selection while the actual expression is performed in the third expression mechanism.

3.3.2. *Unchiku Generation Mechanism*

Unchiku generation was conducted based on nouns related to four keywords, "explanation keywords," for explanation and nouns included in Fig. 3, "stage performance keywords." Nouns related to explanation keywords were collected from the nouns in the respective explanation texts (Fig. 2) and those in the abstract parts of Wikipedia texts were directly linked to the nouns in the explanation texts. We used the morphological analyzer MeCab to extract nouns from Wikipedia texts. For the nouns included in Figure 3, we collected nouns from the abstract parts of Wikipedia texts and the texts of Kotobank (Digital Daijisen) using MeCab.

Next, for all explanation keywords, we calculated the vector of all related nouns as parameters. In particular, if S is a set in which the elements are the n nouns p for an

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(中啓の舞
 ("No" ("1" "2" "3" "4" "5" "6" "7" "8" "9" "10"))
 ("The_flow_of_the_stage_performace" ("乱拍子に続いて、能の鐘づくしに従って、本舞台の中央で踊る。" "" "" "" ""
        "" "" "" ""))
 ("Time" ("23:03 ~ 23:16" "23:18 ~ 23:44" "23:45 ~ 24:13" "24:14 ~ 24:41" "24:42 ~ 25:10" "25:11~25:41" "25:42~26:11"
        "26:12~26:48" "26:50~27:17" "27:19~27:52"))
 ("Characters" ("白拍子花子" "白拍子花子" "白拍子花子" "白拍子花子" "白拍子花子" "白拍子花子" "白拍子花子" "白拍
        子花子" "白拍子花子" "白拍子花子")) ("Mind" ("娘 (P)" "娘 (P)" "娘 (P)" "娘 (P)" "娘 (P)" "娘 (P)" "娘 (P)" "娘
        (P)" "娘 (P)" "娘 (P)"))
 ("Action" ("白拍子 (P)" "白拍子 (P)" "白拍子 (P)" "白拍子 (P)" "白拍子 (P)" "白拍子 (N)" "白拍子 (N)" "白拍子 (N)" "白
        拍子 (P)" "白拍子 (P)")) ("Lyrics" ("鐘に恨みは数々ござる (N)" "初夜の鐘を撞く時は (N)" "諸行無常と響く
        なり (N)" "後夜の鐘を撞く時は (N)" "是生滅法と響くなり (N)" "晨朝の響きは生滅々己 (N)" "入相は寂滅為
        楽と響くなり (N)" "聞いて驚く人もなし (N)" "われも五障の雲晴れて (P)" "真如の月を眺め明かさん (P)"))
 ("Scene_of_the_legend_of_Dojoji" ("N" "N" "N" "N" "N" "N" "N" "N" "P または P+" "P または P+"))
 ("Music_genres_and_characteristics" ("能（鐘づくし）" "能（鐘づくし）" "能（鐘づくし）" "能（鐘づくし）" "能
        （鐘づくし）" "能（鐘づくし）" "能（鐘づくし）" "能（鐘づくし）" "能（鐘づくし）" "能（鐘づくし）
        "))
 ("Narrators" ("歌い手（8 人）" "歌い手（8 人）" "歌い手（8 人）" "歌い手（8 人）" "歌い手（8 人）" "歌い手（8
        人）" "歌い手（8 人）" "歌い手（8 人）" "歌い手（8 人）" "歌い手（8 人）"))
 ("Musicians" ("三味線（8 人），太鼓（2 人）" "三味線（8 人），太鼓（2 人）" "三味線（8 人），太鼓（2 人）" "三
        味線（8 人），太鼓（2 人）" "三味線（8 人），太鼓（2 人）" "三味線（8 人），太鼓（2 人）" "三味線（8
        人），太鼓（2 人）" "三味線（8 人），太鼓（2 人）" "三味線（8 人），太鼓（2 人）" "三味線（8 人），
        太鼓（2 人）"))
 ("Musical_instruments" ("三味線，小鼓，太鼓，笛" "三味線，小鼓，太鼓，笛" "三味線，小鼓，太鼓，笛" "三味線，
        小鼓，太鼓，笛" "三味線，小鼓，太鼓，笛" "三味線，小鼓，太鼓，笛" "三味線，小鼓，太鼓，笛" "三味
        線，小鼓，太鼓，笛" "三味線，小鼓，太鼓，笛" "三味線，小鼓，太鼓，笛"))
 ("Background_music/Wooden_clappers" ("-" "-" "-" "-" "-" "-" "-" "-" "-" "-"))
 ("Scene" ("桜の木（道成寺）" "桜の木（道成寺）" "桜の木（道成寺）" "桜の木（道成寺）" "桜の木（道成寺）" "桜
        の木（道成寺）" "桜の木（道成寺）" "桜の木（道成寺）" "桜の木（道成寺）" "桜の木（道成寺）"))
 ("The_place_on_stage" ("本舞台: 中央" "本舞台: 中央" "本舞台: 中央" "本舞台: 中央" "本舞台: 中央" "本舞台: 中央" "本
        舞台: 中央" "本舞台: 中央" "本舞台: 中央" "本舞台: 中央"))
 ("Costume" ("赤" "赤" "赤" "赤" "赤" "赤" "赤" "赤" "赤" "赤"))
 ("Small_props" ("中啓" "中啓" "中啓" "中啓" "中啓" "中啓" "中啓" "中啓" "中啓" "中啓"))
 ("Stage_equipment" ("道成寺，鐘，桜の木" "道成寺，鐘，桜の木" "道成寺，鐘，桜の木" "道成寺，鐘，桜の木" "道
        成寺，鐘，桜の木" "道成寺，鐘，桜の木" "道成寺，鐘，桜の木" "道成寺，鐘，桜の木" "道成寺，鐘，桜
        の木" "道成寺，鐘，桜の木"))
 ("The_point_of_the_dancer's_body" ("足" "足" "足" "足" "足" "足" "足" "足" "足" "足")))
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Fig. 3. An *unchiku* knowledge of a scene in *Kyōganoko Musume Dōjōji* (The scene is "*Chūkei no Mai*").

explanation keyword, the vector v of the explanation keyword is

$$v = \{a_1, a_2, ..., a_i, ..., a_n\} \quad S = \{p_1, p_2, ..., p_i, ..., p_n\}$$

Here, the component a_i is the total of the noun p_i, included in the texts related to the explanation keywords. For example, the vector of the keyword Kiyohime is:

$$S_{Kiyohime} = \{Hidakagawa, ..., Gein\bar{o}, ..., \quad Sanchi\}$$

$$v_{Kiyohime} = (1, ..., 2, ..., 1)$$

Here, there are four types of explanation keywords and the vectors range from v_1 to v_4. Regarding n of the four keyword types, 333 were Kiyohime, 128 were Anchin, 186 were Kumano, and 423 were Dōjōji. The nouns in each explanation keyword are shown in Figures 4, 5, 6, and 7. In addition, as the result of the morphological analysis is not processed, numerals, brackets, and symbols are mixed in the nouns.

Next, in Figure 3, we prepare the vectors of each stage performance's keywords. In particular, there were 31 keywords. The vector w corresponding to the vector v_i for each explanation keyword is formed by the following

日高川, 町, 寺院, 僧, 安珍, 悲恋, 情念, テーマ, 題材, 道成寺, 縁起, ようるり, 三味線, 楽器, ししょう, 劇場, 詞章, 歌, 人物, セリフ, 仕草, 描写, 語り口, 叙事, 系統, 音曲, 語り物, もの, 個々, 太夫, 口演, その後, 義太夫, 河東, 一中節, 常磐津, 富本節, 清元, 新内, 宮, 薗, 節, 薗八節, |8|, 存在, 単独, 素, 浄瑠璃, ほか, 人形, 劇, 人形浄瑠璃, 文楽, 音楽, 舞踊, 伴奏, 流派, ごと, 形態, 後述, 固有, 演劇, 重要, 文化財, |1965|, |4|, |20|, 日,])。, 演技, 演出, 様式, 上演, 歌舞伎, |2005|, ユネスコ, 傑作, 宣言, |2009|, 無形, 文化, 遺産, 代表, 一覧, 表, 記載, 能, 伝統, 芸能, 一, 分野, 江戸, 猿楽, 狂言, 能楽, 総称, の, 明治維新, 後, 近代, 造語, 言葉, 明瞭, 規定, 国文学, 民俗, 民族, 神話, 学, 領域, 広義, 伝承, 話, 物語, 一般, 昔話, 民話, 同義, 使用, 狭義, 意味, 説話, 説明, ドイツ, メルヒェン, Marchen, フェアリーテイル, fairy, tale, メルヘン, スティス・トンプソン, 英語, 圏, よう, -, 文治, 元年, |1185|, /, 建, 久, |1192|, 歴史, 区分, 一つ, 延, 暦, |13|, |794|, 桓武, 天皇, 府, 都, |390|, 年間, 京都, 平安京, 鎌倉, 幕府, 成立, 政治, 唯一, 中心, 通常, 末期, 萌芽, 可能, 過渡, 理解, 近年, 荘園, 公, 領, 制, 確立, 院政, 期, |1100|, 見解, 有力, 学校, 教育, これ, 構成, 教科書, 律令制, 王朝, 国家, 体制, 移行, 中期, |900|, 頃, 以降, 発端, 意見, 古代, 中世, どちら, 分類, 議論, 中立, 概念, 主, 文学, 史, 世界, 中古, 語, 天台宗, いしゅう, |,|, Tiantai, 発祥, 大乗, 宗派, ひとつ, 王, 妙法, 蓮華, 経, 法華経, 根本, 仏典, ため,]、, 法華宗, てん, だい, しゅう, 名称, 実質, 的, 開祖, 智, 顗, 天台山, 由来, 天台, 教学, 入唐, 最澄, 伝教大師, 平安, 時代, 初期, |9|, 世紀, 多く, 仏教, 宗旨, ここ, 展開, 今日, 中国, 朝鮮, ベトナム, 信徒,]。, 日高, 川, ひだ, 中部, 本流, 延長, 熊野川, 紀ノ川, 中, |3|, 番目, さ, 最長, 日本一, |2008|, 年, |10|, 月, 現在, 流域, 上流, 部, 吉野, 郡, 十津川, 村, 一部, 内陸, 奈良, 定義, 上, 二, 級, 水系, こと, [, |1|,][, 注釈, |2|,], 河川, 法, 県内, 区間, 指定, 管理, 珍, 清姫, 伝説, 舞台, 有名, わか, 英, :, Wakayama, Prefecture, 近畿, 地方, 県庁, 所在地, 和歌山, 市, 日本, 最大, 紀伊, 半島, 南西, 側, 位置, 県, 南部, 規模, 山地[Hidaka River, town, temple, monk, Anchin, tragic love, passion, theme, theme, Dojoji temple, Engi, youruri, syamisen, instrument, Sisyo, theatre, lyrics, song, character, words, gestures, description, the way one tells, description, system, music, Katarimono, thing, individual, Dayu, oral, afterwards, Gidayu, Kato, Ichichubushi, Tokiwazu, Tomimoto-bushi, Kiyomoto, Shinnai, miya, field, section, sonohachibushi, 8, existence, alone, elementary, joruri, other, doll, play, Ningyo Joruri, Bunraku, music, dance, accompaniment, school, every, form, see below, unique, theater, important, cultural property, 1965, 4, 20, day,])., acting, directing, style, performance, kabuki, 2005, UNESCO, masterpiece, declaration, 2009, intangible, culture, heritage, representative, list, table, description, noh, tradition, entertainment, one, field, Edo, Sarugaku, Kyogen, Nogaku, generic term, of, Meiji Restoration, rear, modern, coined word, word, clarity, regulations, Japanese literature, folklore, people, mythology, study, region, in a broad sense, tradition, talk, narrative, general, old tale, folktales, synonymous, use, narrow meaning, meaning, narrative, explanation, Germany, fairy tale, marchen, fairy tale, fairy, tale, fairy tale, stith thompson, english, category, yo, -, Bunji, first year, 1185, /, ken, hisashi, 1192, history, classification, one, nobu, calendar, 13, 794, Kanmu, Emperor, fu, capital, 390, year, Kyoto, Heiankyo, Kamakura, Shogunate, established, politics, only, center, generally, terminal stage, sprouting, possible, transient, understanding, recent years, manor, public, ryo, system, established, cloister rule, period, 1100, opinion, influential, school, education, this, composition, textbook, Ritsuryo system, dynasty, nation, system, migration, midterm, 900, around, later, origin, opinion, ancient, middle ages, which, classification, siscussion, neutral, concept, main, literature, history, world, second hand, word, tendai sect, ishu, , , tiantai, origin, Mahayana, religious, one, king, Mysterious method, Lotus flower, sutra, Hokkekyo, root, Buddhist scriptures, for,],, hokke sect, ten, dai, syu, name, real, target, founder, satoshi, peaceful, Tiandai Mountain, origin, tendai, theology, irikara, saicho, Dengyo Daishi, Heian, age, initial, 9, century, many, Buddhism, mission, here, deployment, today, China, Korea, Vietnam, believers,]., Hidaka, river, folds, chubu, mainstream, extension, Kumano River, Kinokawa, during , 3, ~th, difference, longest, No. 1 in Japan, 2008, year, 10, month, current, basin, upstream, department, Yoshino, county, Totsukawa, village, part, inland, Nara, definition, up, two, class, water system, matter, [, 1,] [, annotation, 2,], river, law, within the prefecture, section, specify, management, rare, Kiyohime, legend, stage, well known, waka, english, ::, wakayama, prefecture, kinki, rural, prefectural office, location, Wakayama, city, Japan, maximum, kii, peninsula, southwest, ~ side, position, prefecture, southern, scale, mountains,]

Fig. 4. Nouns for the vector components of Kiyohime

紀州 僧 少女 激怒 変化 鐘 安珍 こと 内容 蛇 英 snake][|2|]) 爬虫 綱 有 ヘビ 亜 Serpentes 分類 爬虫類 総称 |3|トカゲ 類縁 関係 共 鱗目 構成 |4| 体 四肢 退化 の 特徴。同様 形 動物 他 群 存在 せつ 英語 legendドイツ 語 Legende 人物 自然 現象 等 日常 茶飯事 もの 異常 体験]、形式 上 事実 [|1|] 説話 一種 和歌山 県 日高 郡 日高川 町 鐘巻 天台宗 寺院 西国 十三 箇所 |5| 番 札所 道成寺 創建 髪長 宮子 姫 伝記 能 歌舞伎 浄瑠璃 演目 伝説 平安 時代 中期 編纂 大日 本国 法華 験 記 話 拝観 際 縁起 堂 珍 清姫 絵巻物 絵 説法 紀伊 きいくに 日本 地方 行政 区分 令 制 国 一つ 南海 道[Kishu, monk, girl, fury, change, bell, Anchin, matter, contents, snake, English, snake,] [, 2,]), reptiles, tsuna, yes, snake, sub, serpents, classification, reptiles, generic term, 3, lizards, relationship, relationship, both, scale, eye, composition, 4, body, limb, degenerate, of, feature,]., similarly, shape, animal, other, group, existence, theory, english, legend, Germany, word, legend, person, nature, phenomenon, etc., every day, tea ceremony, thing, abnormal, experience,],, format, up, fact, [, 1,], narrative, kind, Wakayama, prefecture, Hidaka, county, Hidaka River, town, Kanemaki, Tendai sect, temple, saigoku, ten, three, part, 5, turn, fudasho, Dojoji Temple, founded, hair length, miyako, princess, biography, Noh, kabuki, Joruri, performance, legend, Heian, age, midterm, compilation, dainichi, home country, hoke, trial, record, talk, visit, edge, Engi, hall, rare, Kiyohime, picture scroll, picture, preaching, Kii, Kii, Kuni, Japan, rural, administration, classification, ordinance, system, country, one, Nankai, road]

Fig. 5. Nouns for the vector components of Anchin

nouns that satisfy $q \in S_i$ in the nouns q regarding stage performance keywords, as shown in

$$w = \{b_1, b_2, \ldots, b_i, \ldots, b_n\}$$

The from w_1 to w_{31}. The vector's component b_j is the total of the nouns q_j (the same name as p_j) that are included in stage performance keywords. For instance, the vector of "Ranbyōshi," one of the stage performance keywords is as follows.

$$S_{Kiyohime} = \{Hidakagawa, \ldots, Gein\bar{o}, \ldots, \quad Sanchi\}$$

$$v_{Ranbyoshi} = (0, \ldots, 2, \ldots, 0)$$

W is a set of vector of stage performance keywords and calculated for each vector v_i. W_i corresponded to v_i is

$$W_i = \{w_{i,1}, w_{i,2}, \ldots, w_{i,n}\}$$

ちか つうら 東牟婁 郡 しん 熊野川 河口 人口 二 経済 産業 古道 中辺路 辺 路 ルート 分岐 点 口 |1000| km |2| 面積 順位 |20| 位 総称 名 前 通り 仏教 要素 全国 |3| 千 社 神社 本社 権現 参照 こと |2004| 年 月 ユネスコ 世界 遺産 霊場 参詣 資産 登録 くま 南端 大概 一致 三山 田辺 本宮 新宮 速玉 那智勝浦 町 那智 大社 信仰 地 ょうここ 古語 昔 意味 前期 古代 中世 上古 中古 近古 三 分 歴史 文献 記録 最初 く に 一つ 南海 道 せい 律令制 設置 りつりょう 飛鳥 明治 初期 基本 単位 現在 地理 的 機能 都道府県 行政 機関 庁 ちょう 国衙 中心 都市 域 国府 府中 三重 Mie 中部 [|1|] 津 江戸 時代 伊勢参り お蔭 名 伊勢神宮 発展 令 制 全域 当初 熊野 一部 |4| 構成 律令 数 |7| 国 包括 兵庫 北勢 伊賀 中 勢 南勢 伊勢 志摩 東 紀州 |5| 地域 区分 わか 英 : Wakayama Prefecture 近畿 地方 県庁 所在地 和歌山 市 南西 側 位 置 県 南部 規模 山地 きい はん 本州 中央 部 南側 太平洋 日本 最大 名称 自然 豊か 木 紀伊 半島 紀[chika, tsu, ra, Higashimuro, county, core, Kumano River, estuary, population, two, economy, industry, Kodo, Nakahenro, edge, road, root, branch, point, mouth, 1000, km, 2, area, ranking, 20, rank, generic term, name, street, Buddhism, element, whole country, 3, thousand, company, shrine, main office, Gongen, reference, matter, 2004, year, month, UNESCO, world, heritage, sacred place, visit, assets, register, bear, southern end, mostly, match, Miyama, Tanabe, Motomiya, Shingu, hayatama, Nakatsuura, town, Nachi, Taisha, faith, ground, yoko, child, Kogo, long ago, meaning, prophase, ancient, middle ages, Joko, Chuko, three, minutes, history, literature, record, first time, kuni, one, Nankai, road, because of, Ritsuryo system, installation, rate, ryo, Asuka, Meiji, initial, basic, unit, current, geography, target, function, prefectures, administration, institution, agency, cho, national, center, city, area, Kokufu, Fuchu, Mie, Mie, Chubu, [, 1,], Tsu, Edo, age, Visit Ise, thanks, name, Ise Jingu, development, ordinance, system, whole area, initially, Kumano, part, four, composition, Ritsuryo, number, 7, country, comprehensive, Hyogo, Hokusei, Iga, chu, force, Nansei, Ise, Shima, east, Kishu, 5, area, classification, waka, English, ::, Wakayama, prefecture, Kinki, rural, prefectural office, location, Wakayama, city, southwest, side, position, prefecture, southern, scale, mountains, Kii, stamp, Honshu, central, department, south side, Pacific Ocean, Japan, maximum, name, nature, rich, wood, Kii, peninsula, ki]

Fig. 6. Nouns for the vector components of Kumamo

日高川 鐘巻 新 第 5 番 札所 創建 髪長 姫 伝記 演目 安珍 編纂 話 大日 本国 説話 集 通称 著者 比叡山 鎮源 伝 不詳 下 巻]。『 本朝 験 ようほっけげんき]、『 日本国 法華 経験 記][ ]（ ほん きょうげんき)[文治 元年 |1185| 建 久 |1192| 歴史 区分 延 暦 |13| |794| 桓武 府 都 |390| 年間 京都 平安京 鎌倉 幕府 政治 上 唯一 中心 通常 末期 萌芽 可能 過渡 理解 近年 荘園 公 領 制 確立 院政 期 |1100| 見解 有力 学校 教育 これ 構成 教科書 律令制 王朝 国家 体制 移行 中期 |900| 頃 発端 意見 古代 中世 どちら 分類 議論 中立 概念 主 文学 史 世 界 中古 あん ちん せつ 紀州 伝説 思い 僧 少女 清姫 激怒 あまり 蛇 変化 道成寺 鐘 安 珍 内容 ょうるり 三味線 楽器 ししょう 劇場 詞章 歌 中 セリフ 仕草 描写 語り口 叙事 さ 系統 曲種 語り物 以降 個々 太夫 口演 その後 成立 義太夫] 河東 一中節 常磐津 富本節 清元 新内 宮 薗 節 薗八節 存在 単独 素 浄瑠璃 ほか 人形 劇 人形浄瑠璃 文楽 音楽 舞踊 伴奏 流派 ごと 形態 後述 固有 演劇 重要 文化財 |1965| |4| |20| 指定])。演技 演出 様式 上演 歌舞伎 |2005| ユネスコ 傑作 宣言 |2009| 無形 文化 遺産 代表 一覧 表 記載 能 伝統 芸能 分野 江戸 猿楽 狂言 能楽 総称 の 明治維新 後 藤原 宮子 ふじ わら みやこ - 天平 勝 宝 |19| |754| |8| |11| 文武 天皇 夫人 藤原不比等 長女 母 賀茂 比 売 異母 妹 聖武天皇 光明皇后 義理 親子 関係 生前 女性 一 位 叙 人物 皇后 皇太后 史上 初 太皇太后 箇所 しん さい ゅうさんかしょ 一つ 相模 よう 写し 霊場 とき 現在 観音 奉安 うち 西国 十 三 所 もの |1932| 昭和 |7| 制定 下記 巡礼 ルート 一般 寺院 じい 梵 巴 ????? vih ? ra 仏像 出家 者 起居 修行 施設 寺 仏閣 かく 本来 用語 キリスト 教 神道 宗教 教会 神殿 語 稀 神社 天台宗 いしゅう Tiantai 発祥 大乗 宗 派 ひとつ 王 妙法 蓮華 経 法華経 根本 仏典 ため]、法華宗 てん だいしゅう 名称 実質 的 開祖 智 顕 天台山 こと 由来 |3| 天台 教学 入 唐 最澄 伝教大師 平安 時代 初期 世紀 多く 仏教 宗旨 ここ 展開 今日 中国 朝鮮 ベトナム 信徒 [ ]。ん 国 郡 |47| |,| |944| 面積 |655| |39| 密 度 |73| |.| 人 / km |2| |2021| 年 |9| 月 |1| 日 推計 人口 以下 |6| 美浜 はま 由良 印南 なべ 町 みな 日高川町 ひだ ちょう わか 英 : Wakayama Prefecture 近畿 地方 県庁 所在地 和歌山 市 日本 最大 紀伊 半島 南西 側 位置 県 南部 規模 山地[Hidaka River, Kanemaki, new, no., 5, turn, Fudasho, founded, hair length, princess, biography, performance, Anchin, compilation, talk, dainichi, home country, narrative, collection, known as, author, Mt. Hiei, Chingen, den, unknown, under, roll,]. ", Honcho, trial, yohokkegenki,], ", Japan, Hoke, experience, record,] [,] (, book, today, fine,) [, Bunji, first year, 1185, ken, hisashi, 1192, history, classification, nobu, calendar, 13, 794, Kanmu, fu, capital, 390, year, Kyoto, Heiankyo, Kamakura, shogunate, politics, up, only, center, generally, terminal stage, sprouting, possible, transient, understanding, recent years, manor, public, ryo, system, established, cloister rule, period, 1100, opinion, influential, school, education, this, composition, textbook, Ritsuryo system, dynasty, nation, system, migration, mid-term, 900, around, origin, opinion, ancient, middle ages, which, classification, discussion, neutral, concept, main, literature, history, world, second hand, an, chin, setsu, kishu, legend, thought, monk, girl, Kiyohime, loose the temper, amari, snake, change, Dojoji Temple, bell, an, chin, contents, youruri, Shamisen, instrument, Sisho, theatre, lyrics, song, chu, dialogue, gesture, depiction, narrative, storytelling, difference, system, music, narrative, or later, individual, tayu, oral, afterwards, established, Gidayu,], Kato, Ichichubushi, Tokiwazu, Tomimoto-bushi, Kiyomoto, shinnai, miya, son, section, Sonohachibushi, existence, alone, elementary, Joruri, other, doll, play, Ningyo Joruri, Bunraku, music, dance, accompaniment, school, every, form, see below, unique, theater, important, cultural property, 1965, four, 20, specify,])., acting, directing, style, performance, kabuki, 2005, UNESCO, masterpiece, declaration, 2009, intangible, culture, heritage, representative, list, table, description, noh, tradition, entertainment, field, Edo, Sarugaku, Kyogen, Nogaku, generic term, of, Meiji Restoration, rear, Fujiwara, Miyako, fuji, wara, miyako, ---, Tenpyo, win, treasure, 19, 754, 8, 11, Bunbu, Emperor, Mrs., Fujiwara no Fuhito, eldest daughter, mother, Kamo, ratio, sell, half-mother, sister, Emperor Shomu, Empress Komyō, in-law, parent and child, relationship, during life, woman, one, rank, jo, person, empress, queen mother, history, first time, empress dowager, part, shin, sai, yusankasyo, one, sagami, yo, copy, sacred place, when, current, Kannon, Houan, home, Saigoku, ten, three, place, mono, 1932, Showa, 7, enactment, the below described, pilgrimage, root, general, temple, Jii, Bon, tomoe, ?????, vih, ??, ra, Buddha statue, Buddhist priest, person, relocation, training, institution, temple, temples, kaku, originally, the term, Christ, teaching, shinto, religion, church, temple, word, rare, shrine, Tendai sect, ishu, tiantai, origin, mahayana, religious, one, king, Myoho, lotus flower, sutra, Hokkekyo, root, Buddhist scriptures, for,],, Hokke sect, ten, dai, syu, name, real, target, founder, satoshi, peaceful, Tiantai Mountain, matter, origin, 3, tendai, theology, Irikara, Saicho, Dengyo Daishi, peace, age, initial, century, many, Buddhism, mission, koko, deployment, today, China, Korea, Vietnam, believers, [,]., hmm, country, county, 47, ,, 944, area, 655, 39, density, 73, .., man, /, km, 2, 2021, year, 9, month, 1, day, estimate, population, less than, 6, mihama, hama, Yura, Inami, nabe, town, mina, Hidaka, kawamachi, hida, cho, waka, English, :, Wakayama, prefecture, Kinki, rural, prefectural office, location, Wakayama, city, Japan, maximum, Kii, peninsula, southwest, ide, position, prefecture, southern, scale, mountains,]

Fig. 7. Nouns for the vector components of Dōjōji

Next, for the vector v_i of stage performance keywords, the cos values the angle between vectors $w_{i,j}$ of stage performance keywords forming W_i and v_i are calculated. The results are shown in Table 1. This result shows the

Table 1. Cosine similarity of two vectors in "Kiyohime"

Explanation keyword	Value of cos
Kiyohime	雲 (cloud,0.36), 恨み (ill will,0.33), 諸行無常 (all things must pass,0.33), 三味線 (Japanese guitar,0.29), 能 (Nō,0.28), 道成寺 (Dōjōji,0.23), 白拍子 (shirabōshi,0.23), 月 (moon,0.22), 小鼓 (small drum,0.22), 鐘 (bell,0.19), 桜の木 (cherry tree,0.19), 歌い手 (singer,0.19), 五障 (five problem,0.19), 真如 (shinyo,0.18), 己 (itself,0.18), 時 (time,0.17), 赤 (red,0.17), 乱拍子 (ranbōshi,0.17), 娘 (girl,0.16), 楽 (fan,0.16), 笛 (flute,0.15), 舞台 (stage,0.14), 初夜 (first night,0.13), 白拍子花子 (Shirabōshi Hanako,0.12), 太鼓 (drum,0.07), 人 (human,0.05), 中央 (center,0.05), 足 (foot,0.04), 法 (law,0.03), 中啓 (chūkei,0), 是 (correct,0)
Anchin	道成寺 (Dōjōji,0.54), 雲 (cloud,0.46), 恨み (ill will,0.44), 諸行無常 (all things must pass,0.41), 三味線 (Japanese guitar,0.34), 鐘 (bell,0.33), 桜の木 (cherry tree,0.32), 月 (moon,0.32), 時 (time,0.26), 乱拍子 (ranbōshi,0.22), 初夜 (first night,0.2), 能 (Nō,0.16), 赤 (red,0.15), 楽 (fan,0.14), 歌い手 (singer,0.14), 舞台 (stage,0.14), 五障 (five problem,0.13), 真如 (shinyo,0.13), 笛 (flute,0.13), 小鼓 (small drum,0.11), 娘 (girl,0.11), 白拍子 (shirabōshi,0.11), 太鼓 (drum,0.08), 白拍子花子 (Shirabōshi Hanako,0.08), 中啓 (chūkei,0.06), 中央 (center,0.06), 己 (itself,0.06), 人 (human,0.06), 足 (foot,0), 是 (correct,0), 法 (law,0)
Kumano	桜の木 (cherry tree,0.25), 己 (itself,0.2), 能 (Nō,0.17), 三味線 (Japanese guitar,0.16), 白拍子 (shirabōshi,0.14), 道成寺 (Dōjōji,0.11), 中央 (center,0.09), 赤 (red,0.08), 雲 (cloud,0.08), 小鼓 (small drum,0.08), 舞台 (stage,0.08), 時 (time,0.07), 月 (moon,0.06), 五障 (five problem,0.05), 諸行無常 (all things must pass,0.05), 足 (foot,0.05), 笛 (flute,0.04), 太鼓 (drum,0.04), 楽 (fan,0.04), 乱拍子 (ranbōshi,0.04), 真如 (shinyo,0.04), 恨み (ill will,0.03), 鐘 (bell,0.02), 歌い手 (singer,0.02), 娘 (girl,0.02), 初夜 (first night,0.02), 中啓 (chūkei,0), 白拍子花子 (Shirabōshi Hanako,0), 是 (correct,0), 法 (law,0), 人 (human,0),
Dōjōji	道成寺 (Dōjōji,0.42), 雲 (cloud,0.38), 諸行無常 (all things must pass,0.38), 恨み (ill will,0.33), 三味線 (Japanese guitar,0.27), 能 (Nō,0.25), 五障 (five problem,0.23), 月 (moon,0.23), 舞台 (stage,0.23), 時 (time,0.21), 白拍子 (shirabōshi,0.21), 鐘 (bell,0.21), 楽 (fan,0.19), 小鼓 (small drum,0.19), 真如 (shinyo,0.18), 初夜 (first night,0.18), 桜の木 (cherry tree,0.18), 乱拍子 (ranbōshi,0.18), 歌い手 (singer,0.17), 赤 (red,0.16), 己 (itself,0.14), 笛 (flute,0.11), 白拍子花子 (Shirabōshi Hanako,0.1), 娘 (girl,0.09), 人 (human,0.06), 太鼓 (drum,0.05), 中央 (center,0.04), 足 (foot,0.02), 中啓 (chūkei,0), 是 (correct,0), 法 (law,0)

cos similarity between the explanation keywords and stage performance keywords. The values of cosine in this figure are of the stage performance keywords in each explanation keyword.

Further, Table 2 illustrates the result that, for each explanation keyword, the ranking of the lines according to the order of the values of cosine similarity. For example, in Kiyohime, the ninth line is selected first. In particular, the mechanism selects a line that includes one or more nouns with the highest cosine similarity. If there are two or more candidates, the mechanism selects a line by checking the height of the cosine similarity of the other nouns in order.

Table 2. Ranking for explanation keyword

Ranking	Kiyohime	Anchin	Kumano	Dōjōji
1st	S 9	S 9	S 6	S 9
2nd	S 3	S 3	S 9	S 3
3rd	S 1	S 1	S 2	S 1
4th	S 10	S 2	S 4	S 10
5th	S 2	S 10	S 10	S 2
6th	S 4	S 4	S 3	S 4
7th	S 6	S 7	S 1	S 7
8th	S 7	S 6	S 7	S 6
9th	S 8	S 8	S 5	S 8
10th	S 5	S 5	S 8	S 5

3.3.3. Expression Mechanism

This mechanism controls the entire cycle of the proposed system and actually represents explanation texts, *unchiku* texts, and animations as moving illustrations for the *unchiku* texts for four types of keywords in an inputted story. The representation of explanation and *unchiku* were conducted according to the abovementioned methods in the following procedure.

1. The expression mechanism represents an explanation text for each explanation keyword in the inputted story.

2. Based on the explanation keyword, the expression mechanism represents an *unchiku* text. In particular,

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based on Table 2, the mechanism selects a line and represents by simple natural language sentences. If the line has been selected, it searches for a line from the other candidates.

3. Next, an animation corresponded to the generated *unchiku* text is represented. In particular, all the lines in Table 2 correspond to the codes associated with animation. Each code is a set of commands for the animation representation. As stated in Section 2.2.2, all codes and animations of the scene of *Chūkei no Mai* in *Kyōganoko Musume Dōjōji*. is prepared. The mechanism executes a selected code to represent the animation as a moving illustration for the *unchiku* text.

Figure 5 expresses the explanation, *unchiku*, and animation for an event in the inputted story.

3.4. *The Result of the Proposed System*

In this generated result, as depicted in Figure 8, the system inserted an explanation about Kiyohime, and then inserted the *unchiku* about *Chūkei no Mai*. In the textual representation of Figure 8, events, explanation, and *unchiku* are indicated in black, red, and blue, respectively.

An animation was inserted at the end of the *unchiku*. Additionally, the outputted Japanese was translated into English in this figure. The part represented by red means the explanation of the legend of Anchin and Kiyohime that the word of "Kiyohime" is extracted. The blue text represents the *unchiku* that explains the stage performance structure of a part of *Chūkei no Mai* in detail according to the above *unchiku* method in this prototype.

There are several drawbacks with the current prototype version of the system.

First, this study differentiates *unchiku* from explanation and, we acquired the knowledge of explanation from Wikipedia and that of *unchiku* based on the in-depth analysis of a *kabuki* work and the related story as the objects. This discussion could be overgeneralized because *unchiku* based on dictionaries and encyclopedias like Wikipedia may be possible. However, in this study, we simply divide the *unchiku* and explanation generation prior to making the first system framework of *unchiku* generation. The knowledge types and sources of *unchiku* could be taken into consideration in the future. The above problem is related to the direction of research on analyzing and measuring kabuki knowledge using the proposed system.
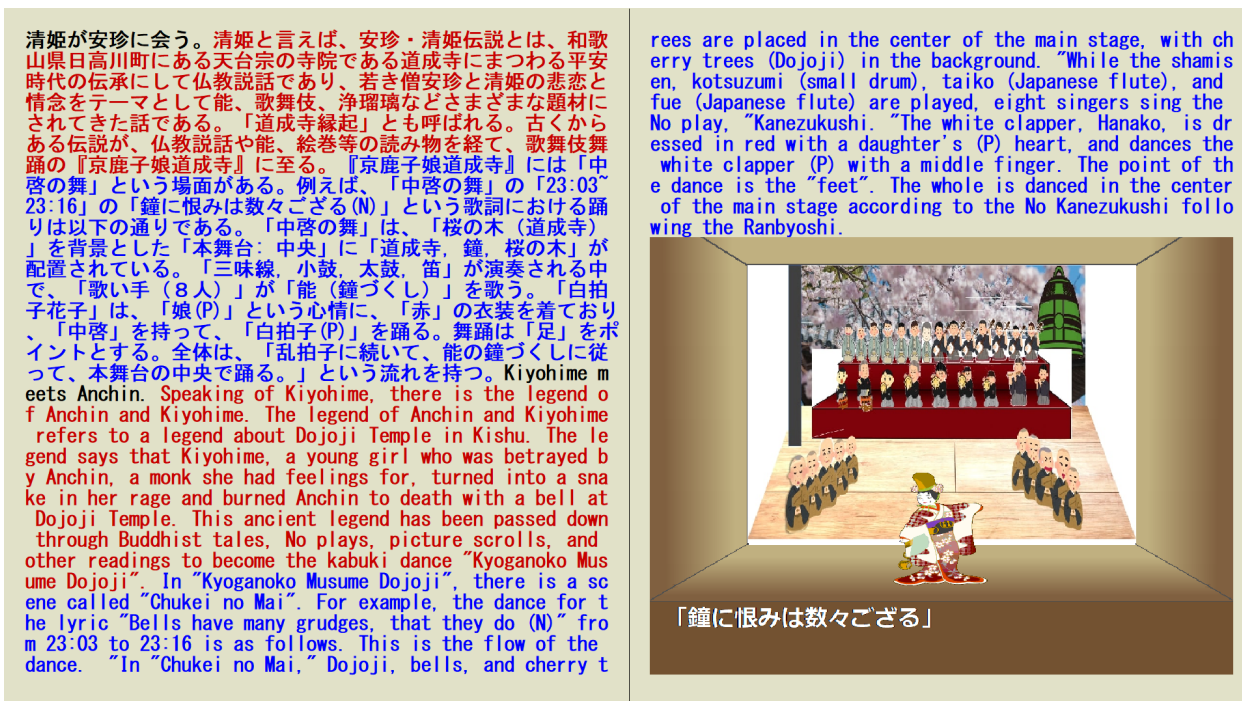

Fig. 8. *Unchiku* generation with moving illustration.

Second, the *unchiku* representation in the system simply outputs the content to be explained in detail. For example, the reader who does not know *Kyōganoko Musume Dōjōji* cannot understand information such as the content of *Chūkei no Mai*, the time that it is represented in the *Kyōganoko Musume Dōjōji*, etc.. Therefore, it is necessary to devise a solution to express the contents of *unchiku*, rather than simply selecting and displaying it.

Third, we generated the *unchiku* of *Kyōganoko Musume Dōjōji* as an association from the legend of Dōjōji. A mechanism that forcibly links to the *unchiku* of *Kyōganoko Musume Dōjōji*, even from completely unrelated stories, must be developed.

Finally, Kawai et al. [22] proposed a method to determine the type and number of explanations about a certain topic according to the amount of knowledge of the user that is represented in the user model. Although we are not dealing with a user model here, the control enables the effective insertion of knowledge.

4. Conclusion

We presented an *unchiku* generation prototype with a moving illustration system using the legend of Dōjōji and *Kyōganoko Musume Dōjōji* as our test model. The system inserts explanations and *unchiku* based on a word into a story and represents an animation to explain the *unchiku*. Although we could use the prototype to demonstrate the concept of multiple explanations based on language and image, the system is only a primitive framework. Further studies will consider narrative explanations and *unchiku* in detail to develop a more universal and advanced technique for explanation, *unchiku*, and animation.
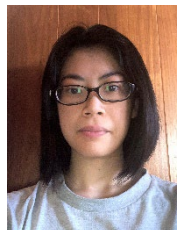
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